CHAPTER 8

# HEALTH IN PREHISTORIC AND HISTORIC BRITAIN: CONCLUSIONS

*. . . in my view, palaeopathological studies, in Britain at least, are uncoordinated and desperately understaffed. Because of this there is little possibility of constructive exchange between archaeologist and palaeopathologist or among palaeopathologists themselves. (Cramp, 1983:19)*

Nobody reading this book will never have suffered from ill-health, and neither did those who came before us. Our journey through the health of our prehistoric and historic ancestors has been a long and arduous one, fraught with problems but enlightening in many respects. We have suffered ill-health at times just writing these chapters! We have dealt with a paucity of data in the earlier periods and have been drowned in data for the medieval periods. Of course, our evidence for health and disease today is more than plentiful and is almost overwhelming. Many would question whether this was the right time to write such a book. As we have seen, there are many problems with the published (and unpublished) data, such that an absolute picture of real frequency rates of disease in the past cannot be made, and thus the vast majority of the data is only interesting for its own sake. However, this book did need to be written to point the way for the future – a future that could be bleak and fruitless if people working in palaeopathology continue to work in the way that they mostly do.

The study of health and disease is not a means to an end. People should not be analysing skeletal remains purely to produce a report (and earn a salary). If the data is to be helpful in the tracing of the history of our island's health and contributing to archaeology as a whole then we need to frame research questions, raise hypotheses and consider all of this in the context of collecting data. People need to be in touch with key research questions, and they need to talk to archaeologists who may have questions that need answering. Equally, analytical approaches must also be considered before information is collected to ensure that it can stand up to statistical examination and testing. Those examining human bone need to keep abreast of current regional, national and international anthropological and archaeological research agendas to ensure that they address both biological and cultural issues. They also need to be aware of the vast literature on the subject (including recent publications) from more than a palaeopathological viewpoint: they must also consider relevant literature in archaeology, anthropology, medical history, geography, climatology and, of course, clinical studies. The study of disease is multidisciplinary and interdisciplinary, and if it is not approached in this way then what is the point? We also need to

ensure that people dealing with skeletal assemblages who are not part of an archaeological unit or involved in a university are not working in isolation from others, but are included in the debates and discussions. We must also ensure that we develop and maintain an open and healthy dialogue with archaeologists to ensure that they are as aware of our aims and objectives as we are of theirs. Both groups need to ensure that their methodologies facilitate and contribute to each other's research objectives.

Palaeopathological work in Britain has had a very long and chequered history with key figures such as Calvin Wells and Don Brothwell playing a major part in developing the discipline. Because we have an inherent interest in our own health, we are also curious about our ancestors' experiences of disease and how they coped with both practical problems and cultural stigmas. We have seen through the years a concentrated effort to document what diseases occurred when and where in Britain, and this is very useful information to have. It is clear, however, that this is where most of the published data lies, as case reports of interesting diseases (see Mays, 1997a for a survey). Collating this data provides a base from which new research projects can tackle bigger questions. Much of the groundwork has been done in palaeopathology. We have a large body of people now who have training in both archaeology and biological anthropology (including the study of palaeopathology). Some of these people have undertaken PhD projects that have looked at health and disease from a population perspective but much more needs to be done.

It is unfortunate for our subject that most of the work in archaeology, anthropology and consequently palaeopathology is undertaken by people working within tight budgets and short time schedules, and often only very basic information about disease is recorded. Furthermore, funding is generally not available for radiography to help diagnosis. The situation pertained when many sites were subject to the vagaries of poorly funded 'rescue' archaeology, and continues since the advent of PPG16 (1990) where, experience has shown, the cheapest bid will almost certainly win the contract – with inevitable consequences for post-excavation analysis and data quality.

In many reports basic site and preservation data that would facilitate calculation of meaningful prevalence rates for disease is not provided, and descriptive work is often not sufficient to support diagnoses. This, of course, later compromises research that wishes to compare populations, such as this, and answer bigger questions. However, we have to rely on the published data because nobody has the time to record all data themselves. If the study of health and disease in Britain is to advance then we need to change how we work. We also have to change the way archaeology as a whole views the study of skeletal remains. Fortunately, university departments of archaeology are now employing more biological anthropologists on their staff, which means that more archaeology graduates are familiar with the benefits of the data derived from human remains. There is also a slight increase in the number of archaeological units employing people with a knowledge of human remains on their staff. However, there is still much more room for improvement. It takes time to record skeletal remains thoroughly and we must take no short cuts or the data will be compromised. Thus, there should be adequate funds in post-excavation programmes to support this work. There is no point in excavating skeletons if they are not analysed properly (or at all). Recording should also be undertaken with some standard system in mind. Buikstra and Ubelaker (1994), despite its limitations, has been widely adopted in the Americas as a way of standardising recorded data, and not only for skeletal material that is to be repatriated and/or reburied. In Britain some people are using this as a basic reference but many are not and it is only recently (2001) that any serious discussion has taken place on whether Britain wishes to adopt standards for recording. The establishment of the British Association for Biological Anthropology and Osteo-

archaeology (BABAO) in 1999 is already providing a forum for important debates and it is hoped that consensuses will be reached and adopted. The authors believe that if this does not happen, and soon, then we should all seriously consider career changes!

Two recent developments within British archaeology are a matter of great concern to the biological anthropological community and both will compromise our ability to undertake work in the future, as the first already has. The first issue of concern reflects an insidious and creeping change in British archaeology: the gradual adoption of the reburial of human remains following excavation. In some cases some analysis is undertaken first, in others it is not. There are several further concerns arising from this situation. Foremost of these is that this trend has been introduced by archaeological curators involved in planning and development control. These are primarily County Archaeological Officers and Diocesan Archaeological Advisers who are acting thus without any reference to the wider archaeological and anthropological community. It has to be assumed that such decisions at least in part reflect a desire to reduce curation costs and storage ramifications where archaeology is undertaken as part of a development. This might also reflect a yet to be articulated unease about disturbing the dead and their long-term curation within museums and universities. The debate about reburial is appropriate given the ethical and financial considerations involved in long-term museum curation, but over the last fifteen years when one of us (MC) has repeatedly expressed a desire to see such a debate taking place (e.g. Cox, 1997; Reeve and Cox, 1999) the archaeological and anthropological community have failed to engage, as have most of our key archaeological organisations (e.g. Insititute of Field Archaeologists; English Heritage). Given the situation that has developed within the US, Australia, New Zealand and Israel, such complacency is at best naïve and at worst arguably negligent. We *must* consider this issue, involving all of those with a legitimate interest in the fate of our dead, and decide if reburial is ever appropriate, under what circumstances, following what type of analysis and sampling, and after what time period. This practice is denying all but immediate access to some assemblages and is clearly unacceptable because even in cases where some analysis is taking place it is almost always under-resourced. We have frequently heard ill-informed curators protest that reburial allows future access to material as long as the location is recorded. However, even the most basic understanding of biology implies that to excavate, clean and dry human bone (which was previously in a state of equilibrium) will itself damage the bone by altering its state. To subsequently replace the dry bone within a damp environment of uncertain biochemical and hydrological status will almost certainly lead to rapid loss of bone mineral and 'dust to dust' will occur with indecent and unnecessary haste. It is our view that unless adequate resources are made available to properly excavate, analyse and appropriately curate skeletons, they should remain undisturbed until such time as the resources are available.

The second issue of concern is that the Government has established (2001) a committee to consider the future of human remains held in museums within the UK. This committee has been formed in consultation with museum curators but again excluding the wider archaeological and anthropological community. This is unacceptable. BABAO made representation to the Chair of the Committee asking that we should be represented but this was initially declined. Since then, M. Cox, on behalf of BABAO, has been allowed to present BABAO's case. The ramifications of this initiative for archaeology in its broadest sense and anthropologists in particular are potentially horrifying in light of repatriation policies, and their interpretation and consequences when adopted in such areas as the USA and Israel.

## THE HEALTH OF OUR ANCESTORS

Before making concluding remarks about the health of our ancestors, we have to reiterate that our data is very far from perfect. Our statistics (dental health and stature aside) are crude prevalence rates, which will always be an unquantifiable under-estimation of the 'real' prevalence of any disease process we discuss. The degree of under-estimation will inevitably vary for different diseases within any period, and for the same disease across periods, so stature and dental health aside, reported trends will be spurious. That said, we will consider such trends as are indicated within the biocultural framework suggested by the archaeological and historical data that survives for each period.

Another key point to consider is the size of our sample for each period; as already stated, these reflect a combination of actual population size during any period, alongside survival of remains as facilitated by contemporary rituals for disposing of the dead, the hydrology and biochemistry of the burial matrix, and the serendipitous nature of archaeological excavation. Ironically, the first of these has the least influence.

For prehistory there is little skeletal evidence to consider which makes interpretation of the data problematic. For the late Palaeolithic and Mesolithic periods we have only a handful of individuals representing populations at that time, while numbers increase for the Neolithic (772), decline for the Bronze Age (291), increase again for the Iron Age (591) and then increase markedly for the Roman (5,716) and early-medieval periods (7,122). The late-medieval period sees the largest sample of all (16,327), with a drop in the post-medieval to 3,790. The more skeletal material there is, therefore, the more that can be said about health and disease at those times.

During the **late Upper Palaeolithic** (10500–8000 BC) a hunter-gatherer way of life in a tundra, and later wooded, landscape prevailed. Occupation was restricted to southern England and south Wales, and caves and rock shelters provided temporary and more permanent accommodation. Summer temperatures appear to have been similar to or slightly higher than today but fluctuations through the period were apparent. Population density was probably fairly low, and it is likely that a hunter-gatherer lifestyle contributed to low fertility. Being a hunter-gatherer no doubt presented its hazards but there is no evidence of zoonoses, infectious disease or trauma from this period. Given the minute sample size for this and the following periods, this lack of data should, however, not be seen as conclusive evidence of absence. Isotopic data suggests that a high protein diet was eaten, and we see evidence of dental calculus which may support this finding. However, we do see evidence for iron deficiency anaemia which suggests low dietary iron but this condition has a variety of causes, including intestinal infections. While there is no evidence of age-related changes in this sample, the lifestyle of these people should predispose them to longevity if they survived the inevitable risk of trauma associated with their way of life, conditions associated with the teens, such as appendicitis, and, of course, the usual obstetric hazards that present in all cultures and periods, including our own.

The **Mesolithic** period (8000–4000 BC) similarly has few extant skeletal remains but occupation is more widespread into northern England and Scotland, and open air occupation sites are noted. Population density increased but was still low. Ireland, the Orkneys and Shetland became islands as sea levels rose and the landscape became increasingly vegetated with trees and shrubs. Later in the period the climate became much wetter and bogs developed, especially in upland areas. Anaemia is again seen but also the first evidence of caries, dental defects and ante-mortem tooth loss. Wild fruits may be responsible for the caries and the dental defects could

indicate stress during growth (as for anaemia). However, defects were only seen in one individual for this period. Joint disease is also noted for the first time but could be linked to a number of factors that may include increasing age at death and activity, reflecting some specialisation of tasks within society. Sacralisation, a developmental anomaly, is also reported. Height is recorded for the first time at 165cm (5ft 4in) for males and 157cm (5ft 1½in) for females.

Within the **Neolithic** period (4000–2500 BC) we have our first evidence of settled communities with permanent housing and domesticated plants and animals. However, hunting and gathering of animals and plants would have continued for some or all populations, possibly seasonally when necessary. Clearance of land is much more extensive than ever seen in the Mesolithic, where small-scale clearances were probably made to attract wild animals. This would lead to soil erosion and a decrease in soil fertility and potentially poor quality grazing for animals and soil for crops. However, given the low population density, this is unlikely to have caused subsistence problems. Manuring may have helped to alleviate the problem but the potential for zoonoses to be contracted from animals would have been a hazard to health. A relatively sedentary existence would inevitably facilitate social organisation, which would have been necessary for the building of large monuments and tombs.

Population numbers, though remaining very low, increase, as does population density, and these provide a setting conducive to density-dependent diseases. However, this is unlikely to have been on a significant scale. Non-specific infectious disease is seen in the form of periostitis, osteitis and periostitis of the sinuses, ribs and the inside of the skull (possible meningitis). These conditions probably indicate poor living environments with inadequate sanitation, and for some a possibly polluted indoor environment. Tumours and congenital disease appear for the first time but not in large numbers. Tumours are mainly seen as benign non-life-threatening osteomas, and congenital disease as premature suture closure, sacralisation and a rare case of clubfoot, a condition which may have presented difficulties in walking for the individual. Perhaps this person could survive because of the settled agricultural community in which they lived, a tolerance of disability and some level of care within the community. Five people were trepanned but in no case was there any evidence of trauma or disease, suggesting that this might have comprised a ritual rather than a remedy. Reflecting the inevitability of obstetric hazards one female was buried with her developing foetus.

Dental disease increases markedly in all respects during the Neolithic, perhaps reflecting the agriculturally based diet these people were eating, but also because of the sample size difference from the previous period. Dental defects and anaemic changes also increase, suggesting that diet and health were perhaps not good for some during childhood. Stature for males has a mean of 165cm (5ft 5in) and for females 157cm (5ft 2in), a decline for males from the Mesolithic and for females. Given the paucity of the remains from the previous period no significance in the difference between the two should be inferred. Related to a rich diet, but also to other factors such as obesity and diabetes, possible diffuse idiopathic skeletal hyperostosis (DISH) is seen for the first time in this period, but it is not seen in any great numbers until the Roman period and later. Osteoporosis is also recorded for the first time (in one person) and circulatory disease in the form of osteochondritis dissecans is also seen. Trauma and joint disease are present in a number of individuals but their occurrence may be related to any number of factors associated with these populations, such as increasing age, workload, accidents and interpersonal violence.

The **Bronze Age** (2600–800 BC) sees people continuing to have an impact on the environment, and the evidence suggests widescale deforestation at this time. We witness the development of a

wide range of industries producing a wealth of products including the introduction of metal artefacts. There is evidence of a further developing social hierarchy with associated wealth and prestige, and interpersonal aggression. Trade and travel are much in evidence across to the continent. The climate, warm and dry at the start of the Bronze Age, became cooler and wetter by the end of our period and into the Iron Age. With the development of metalworking, relevant mineral deposits were exploited for their ores and fuel was needed to smelt the ores. This had an impact on the landscape in the form of major woodland clearances (perhaps made easier with the development of metal tools), and this presented hazards to health in a number of ways. Mining for ores and flints, and metalworking, among other industries, doubtless posed health problems to our population. Clearance of land also allowed intensification of agriculture at this time which increased the hazards of agricultural work and zoonoses.

The wetter and cooler climate at the end of the Bronze Age would have predisposed to the development of lowland mires and fens which were rich resources for both foodstuffs and raw materials. Ideally one lived on the dry land adjacent to a wetland and thus had the benefit of agricultural productivity and the seasonal bounty of the mire or fen. Rates of joint disease and trauma appear to increase at this time, and spondylolysis appears for the first time (trauma to the back of the vertebra). These could relate to almost any of the changes in agricultural or industrial processes occurring through this period. Rates of anaemia and all the dental diseases increase as does stature. Males have a mean height of 172cm (5ft 7¼in) and females of 161cm (5ft 3½in), an increase from the Neolithic. The diversity of the diet being eaten (an increase in cariogenic foods with greater reliance upon agriculture) appears to be creating more dental disease. Stature has increased, suggesting that food supplies were adequate for the majority. DISH is again present suggesting perhaps a measure of rich food consumption and obesity. However, dental enamel defects and anaemia are increasing, suggesting an increase in stress in childhood; the cause of this is unclear. Infectious disease also slightly increases from the Neolithic, with the first appearance of infection of the mastoid process. New tumours are apparent, specifically a primary malignant tumour called a chondrosarcoma and the soft tissue tumour called haemangioma. Spina bifida occulta is also recorded for the first time along with congenital hip dislocation. Evidence continues for trepanation (six) but again no case is associated with trauma or disease so a 'ritual' reason should be considered.

In the **Iron Age** (late ninth century BC to first century AD) there appears to have been an even greater impact on the environment than ever before, but also a continuation of the wet and cool climate of the later Bronze Age. From about 400 BC the climate warms. Early in the period the Iron Age was less forested than later and all types of mire continued to develop. Previously dry areas such as the Fens were enveloped with wet fen. The population would have moved away from these areas and there may have been some increased competition for land. However, with the later warming in this period, populations could develop and cultivate previously marginal land, and forest clearance was again extensive. Settlement patterns became very varied and there is evidence for defence, suggesting periods of aggression. House structures appear similar in basic form to the previous Bronze Age but are larger, and there is evidence of proto-urbanism in the form of hillforts and oppida. Agriculture is intensively practised along with a range of major and minor industries. Interestingly, there is a decline in dental disease, anaemia and infectious disease. However, we do see evidence of osteomyelitis for the first time, and *E. coli* is reported for Lindow Man in Cheshire. Stature for males has a mean of 168cm (5ft 6in), a decline on the previous period, and for females a slight increase to 162cm (5ft 3¾in). Trauma rates decline overall but weapon injuries to the skull appear to increase. Os acromiale appears for the first time,

perhaps reflecting some sort of craft specialisation among developing teenagers. Extra-spinal joint disease also appears to decline but spinal joint disease increases. Circulatory conditions such as Scheuermann's and Perthes' disease are reported for the first time. Congenital diseases are present and lumbarisation and lumbar ribs are first reported. Tumours are present but new types appear in the form of a benign osteochondroma and a soft tissue-induced meningioma; frequencies are still, however, low for this type of disease. There are two reported obstetric casualties and six cases of trepanation, again with no associated trauma.

The **Roman** period (AD 43–first half of the fifth century AD) had a similar climate to today but a decline in temperature around AD 400 impacted on the length of the growing season. It is in this period that we first see the development of formal towns ranging in size and function. Romanisation brought in its wake developments in the number and range of industries, agricultural diversification and improvement, trade and contact. A network of roads improved communications but also allowed diseases to be transmitted more easily. Clearance of land for fuel for industry, heating (including bathhouses), cooking and building work, to grow more food for the increased population (including the army) and to graze more animals meant a clearer, more organised landscape. Clearance of land impacted on soil fertility and possibly on the quality of food. Social organisation was now more complex and for the first time centralised, and some conflict occurred at the beginning and end of the period. Imported foodstuffs (wines and exotics) and crops (including grapes) radically diversified available foodstuffs for many. Consequently, dental disease increased in prevalence and gout appears for the first time, possibly reflecting a rich diet; DISH is also increasing in frequency. Urbanism brought increased stress in various forms and we continue to see an increase in dental enamel defects and childhood anaemia. Scurvy, rickets and osteomalacia are first reported in the Roman period, and osteoporosis increases, possibly reflecting increased longevity or a more sedentary lifestyle for some women. Calcification in the form of 'stones' is first reported, as is ankylosing spondylitis. Mean stature increases slightly for males to 169cm (5ft 6½in) but decreases slightly for females to 159cm (5ft 2½in).

Round houses of the Iron Age type and rectangular buildings are evident in rural areas but radical changes to house construction are in evidence in urban contexts and in villa complexes. Different building materials are used (predominantly clay tiles and bricks). Increased rates of maxillary sinusitis and lesions on ribs are evident and it should be considered that the new types of construction may have had accompanying smoke pollution associated with them (in traditional round houses smoke settles above the eaves level, leaving the area beneath relatively smoke-free). Housing that served both domestic and industrial purposes was common in towns, and in rural areas villas or country houses for the rich were prominent. Urban centres proved detrimental in some respects to health, and we see evidence of pollution from lead from various sources, but towns also provided advances on the Iron Age in terms of the provision of sanitation. However, rates of infectious disease increase and evidence of tapeworms is first recovered from this period, suggesting poor living conditions. Osteitis and septic arthritis appear for the first time, as does leprosy at two sites in the south of England. Twelve cases of tuberculosis are reported, stretching from County Durham to Hampshire. The appearance of this 'new' disease may reflect the introduction of imported and infected Roman cattle or immigrant Roman people; the disease is also reported in faunal remains from Germany from this time (Teegen, *pers. comm.*). Also reported for the first time are possible cases of poliomyelitis and a rarely seen condition called pituitary dwarfism that may have been caused by infection of the pituitary gland. A single case of Paget's

disease is reported from a cave in Gloucestershire at the start of this period; this is the earliest known case in Britain. Neoplastic and congenital diseases are all evident. In addition, the gradual adoption of aspects of Roman medicine (developed from the Greeks) probably emanated from the development of military settlements and towns. The embryotomy reported from Poundbury is an example although, as today, such treatments were not always effective and fifteen obstetric deaths are reported. Joint disease, including Schmorl's nodes, increases from the Iron Age and we see the first appearance of rheumatoid arthritis, Reiter's syndrome and psoriatic arthritis (but only from one site (Poundbury, Dorset) and these diagnoses may be contentious). We see the first report of clay shoveller's fracture, and os acromiale rates increase. Trauma also increases, and decapitation appears for the first time in this period, although this has mostly been interpreted as a part of burial practice. We still see evidence of trepanation (five) not associated with trauma.

The **early-medieval** period (AD 450–1066) experiences a cooler climate at its start, some regeneration of woodland and a decline in function of the Roman towns. Rural living characterises this period until the later years when urbanism starts to develop again. The period also witnessed some immigration of people from the continent, and endemic interpersonal violence, social stratification, developing but different trade and contact, and a variety of industries. Housing comprised small sunken structures and also large timber-framed halls. Agriculture continued as before though the large rural estates may have declined. More than twenty people had weapon injuries to their skulls, mostly unhealed, which suggests interpersonal violence, and some sites had more than one case. Decapitation also continues in this period but again may well still reflect burial practice. Infectious disease increases from the Roman period although there is no evidence of new infections. Leprosy and tuberculosis rates also increase considerably from the Roman period. Paget's disease continues to be reported.

Congenital disease is present and a greater variety of conditions are represented. Possible cases of hydrocephalus, Down's syndrome, osteogenesis imperfecta, diaphyseal aclasia and a particular type of dwarfism are seen. Neoplastic disease also increases in the range of different types observed; multiple myeloma, giant cell tumour, neurofibroma and nasopharyngeal cancer are all recorded for the first time, and several individuals have secondary (metastatic) cancer. There is no evidence to suggest that the increase in variety of neoplastic and congenital diseases reflects deterioration in the quality of the living or working environment, as the return to rural and dispersed settlement would have accompanying health benefits. Dental diseases all decline in frequency (except calculus), which may reflect a return to a more basic agrarian diet. Small numbers of scurvy, rickets and osteoporosis cases are still seen. Anaemia and dental defects increase, suggesting continuing stress during childhood. Thus very few new diseases appear in this period. Mean stature increases and for males is 172cm (5ft 7¼in) and for females 161cm (5ft 3½in) which suggests that diet continues to be adequate.

Joint disease, including Schmorl's nodes and osteochondritis dissecans, also declines, along with trauma, but spondylolysis increases as does os acromiale. Ankylosing spondylitis, DISH, dislocations and Scheuermann's disease are still present and Osgood Schlatter's disease appears for the first time. Evidence for care and treatment is suggested. In this period trepanations in clear association with head injuries are seen, and nineteen of these have healed. One case of amputation is reported. An interesting case of possible hemiplegia, which would have been associated with incapacity and incontinence, is also reported. As ever, obstetric casualties continue.

The **late-medieval** period (mid-eleventh century to mid-sixteenth century AD) begins with a warm period, witnesses a very wet early fourteenth century and thereafter there is climate

instability. We see a fluctuating population, with periods of population decline (through famine and epidemic) and subsequent expansion. While the Church and community structure generally sought to keep a tightly ordered social stratification within society, epidemics and population decline presented opportunities for improvement for the survivors as did the developing urban social hierarchies. Urbanism increases and is associated for many with poor living conditions, inadequate sanitation, increasing urban industry and some development in provision of care and treatment, particularly hospitals. Urban expansion and industrial development see associated aerial pollution alongside that of water courses. We are fortunate in that this period has the largest number of skeletons from cemetery assemblages to consider and also some contemporary documentation referring to aspects of health and disease as well as diet. This fact distinguishes it from earlier periods where documentary evidence (apart from some in the Roman and early-medieval periods) is lacking and 'fleshes out the bones' in terms of a fuller picture of contemporary life and death.

Mortality in this period, particularly the earlier centuries, is characterised by famine and epidemics, with the Black Death being the most significant killer. Diseases of old age such as osteoporosis, Paget's disease, neoplastic and joint disease and gall-stones are all evident. Infectious disease persists and evidence of tuberculosis continues but the most interesting condition is leprosy. Leprosy evoked a complex biocultural response, one mediated by the Church, though the disease probably affected only very small numbers. Other infectious diseases, such as the 'Sweating sickness', first appear towards the end of the period and smallpox starts to become a significant killer. Dental, congenital, neoplastic and metabolic diseases all continue in the archaeological record as would be expected and rates appear to increase, in part reflecting the more representative sample size for the period. Very few new diseases appear here, apart from venereal syphilis, which is clearly pre-Columbian, and was probably introduced and spread by increased venereal contact and trade, and in Europe was spread by armies. DISH increases in this period, probably reflecting the number of monastic assemblages included in the overall sample. DISH is higher in prevalence in monastic groups than in lay assemblages. Stature for males decreases slightly to a mean of 171cm (5ft 7¼in) and for females to a mean of 159cm (5ft 2½in).

Excavation of **post-medieval** contexts (from the Reformation to the mid-nineteenth century) has yielded a much smaller number of skeletons than for the previous period and they generally represent a sample biased towards the higher socio-economic groups, mostly from London. Fortunately, there are very useful documentary sources, such as the London Bills of Mortality. Here we gain an insight into diseases that did not affect the skeleton but were prevalent at this time. These include plague, cholera, smallpox, measles, whooping cough, diphtheria, scarlet fever, typhus, dropsy, liver disease and tissick (asthma), the latter increasing as a cause of death from the 1700s onwards, perhaps reflecting increased aerial pollution. The Bills also list non-natural deaths including suicides, which are also represented archaeologically. While there is little direct evidence of treatment for this period, except for dentistry, we have some documentary evidence that suggests there was an increased attention to teeth (among the upper classes) from the eighteenth century, and for this period there was an increased understanding of medicine and surgery. We also see the first evidence of autopsies, reflecting the growth of scientific enquiry generally.

The post-medieval period is characterised by a dramatically increasing population, overcrowding, urbanisation, agricultural developments and industrialisation. Workloads probably increased and became repetitive in nature for many, no doubt with ensuing health problems. Working conditions and diet were atrocious for both the urban and the rural poor. However, stature remains the same for males (171cm or 5ft 7¼in) and for females increases to 160cm (5ft 3in). This doubtless reflects

the fact that our sample almost entirely represents the middle classes who were better fed. At the beginning of the period the climate was fairly warm but then became colder and there were some very cold wet years. From the sixteenth century coal became increasingly available and aerial pollution increased correspondingly, contributing to respiratory disorders.

Diet deteriorated throughout for the poor and by the end of our period was based on bread, potatoes and tea. Surprisingly, but again reflecting that our skeletal sample does not represent the working-class masses but rather the better-off, dental abscesses decline. This is clearly an artefact of the difference in socio-economic groups. So too is the increase in DISH and the decline in anaemia. For the majority there is every indication from historical sources that dental and overall health deteriorated. We also know from documentary data that scurvy declined as a cause of death in the seventeenth century probably because of the 'new' cultivation of potatoes, although we see little evidence for this skeletally. However, other metabolic diseases are apparent, for example rickets, which in our sample may be partly related to fashionable infant feeding practice. Evidence exists for osteoporosis, neoplastic and congenital diseases, as would be expected. Fracture occurrences seem to correlate with developments in the nature of industry and agriculture and for some would seem to indicate a changing urban environment.

While infectious disease is common, particularly 'fevers', leprosy appears to decline in frequency, apart from in the far north and Scotland. Smallpox is the main cause of death at the start of this period. Cases of venereal syphilis become more common in our assemblages, and tuberculosis takes over from smallpox as the main cause of death in this period; this too is seen in an increased rate in the osteological record. Tuberculosis continues to increase throughout, particularly the pulmonary form. Unusual conditions such as achondroplasia-induced dwarfism are seen for the first time; this brings to four the total of dwarfed individuals for the whole of the duration of the period that this book covers. Overall, it is likely that the end of this period sees the health of the majority at an all-time low.

Fig. 8.1. Distribution of Paget's disease from the Roman to the late/post-medieval period; numbers refer to number of sites if more than one. *(Y. Beadnell)*

Some health problems identified in the data considered were plotted on a map of Britain to explore their distribution patterns (Figs 8.1–8.7; please note that post-Roman refers to the early-medieval period). Some general observations were made, although the authors are very much aware of the limitations of the patterns seen. These difficulties include problems in skeletal diagnosis, the availability of skeletal material in Britain, the lack of survival of skeletons from sites in areas of high acidic soils (e.g. Wales and Scotland), and the concentrated archaeological activity in the south and east of England.

Figure 8.1 illustrates the cases of Paget's disease that have been identified. The earliest example comes from a Roman context, but late-medieval and post-medieval cases dominate the picture. Particularly interesting is that there are few clear examples, but also that they occur

in the south and eastern parts of England. Today Paget's disease has a distribution in England that is primarily in the north-west (www.medvisionfilms.com, Programme 27). Perhaps the low numbers identified reflect problems in diagnosis (histological and radiographic diagnoses are necessary to diagnose the condition), but also that Paget's disease is a disease of the elderly. It may be that this pattern reflects, in part, later increases in life expectancy. Additionally, few sites have been excavated in the north-west of England and therefore the evidence may just not have been found.

Fig. 8.2. Distribution of rickets from the Roman to the late/post-medieval period. *(Y. Beadnell)*

Figure 8.2 shows the cases of rickets identified from the British Isles. We would expect to see more examples in the post-medieval period and later when conditions were such to allow rickets to develop, that is extremes of poverty, polluted environments, and working long hours in dark buildings. However, most of the cases identified come from the Roman period, although all seem to be associated with the higher population density areas of England. Perhaps the lack of cases also derives from the lack of (until recently) clear diagnostic criteria, and the frequent lack of confidence in distinguishing normal bowing of long bones from rickets-induced bowing. However, that our later samples are from higher socio-economic groups, is also a factor here.

Fig. 8.3. Distribution of diffuse idiopathic skeletal hyperostosis from the prehistoric to the late/post-medieval period. *(Y. Beadnell)*

Figure 8.3 illustrates the cases of diffuse idiopathic skeletal hyperostosis (DISH) identified in the British Isles. While authors of skeletal reports from two prehistoric sites have noted probable DISH. the majority of cases come from the early-medieval and later periods. Again they are mainly located in the south and east of England, and located at sites of a monastic nature. Waldron (1985) and Roges and Waldron (2001) have noted the association of DISH with individuals buried in monastic cemeteries, and suggestions that DISH is associated with obesity and diabetes have also been made based on the clinical record (Resnick, 1995). Like Paget's disease,

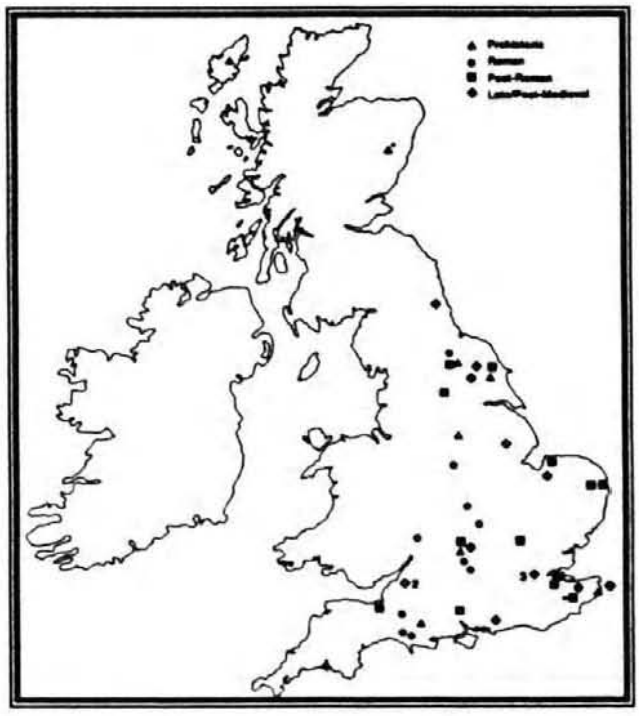

Fig. 8.4. Distribution of neoplastic disease (not ivory osteoma) from the prehistoric to the late/post-medieval period; * in the north-east indicates a site that is not actually specified in the publication and numbers refer to number of sites if more than one. *(Y. Beadnell)*

DISH tends to affect older people (over fifty years old). However, if we accept the argument of fewer older people in the past as a reason for the lack of Paget's disease, we cannot apply that hypothesis to the presence of DISH where there is, indeed, quite a substantial amount of evidence. (Rogers and Waldron, 2001).

Figure 8.4 charts the presence of neoplastic disease (tumours) in the skeletal record; this figure omits the minor ivory osteomas which are of insignificance to an individual (*indicates probable cases in the south-east). If we consider the causes of tumours today (chemicals, radiation, environmental pollution, drugs, etc.), we would expect to find most tumours occurring in the late and post-medieval periods when, certainly, environmental pollution (indoors and out) was increasing. Interestingly, we can see a few examples appearing in the prehistoric period, and the Roman and early-medieval periods also have a fairly strong representation. While late and post-medieval cases are present, there are fewer than one might expect. One is tempted to suggest that the cases we can see may be related to indoor pollution. Again the distribution is south and east oriented which matches well with population density and the areas where most cemetery sites have been excavated.

Figure 8.5 shows the cases of leprosy identified. The earliest come from Roman contexts and are in the south of England, while early-medieval and later cases are more evenly spread around Britian, especially the latter. Correlating with higher population densities, necessary for its transmission, the Scottish cases come later in time and are corroborated by the later founding of leprosy hospitals in Scotland (Roberts, 1986), assuming that the density dependent disease of leprosy is reflected by hospitals. The early-medieval cases are in the southern half of England, particularly to the east. Indeed one comes from the south-west on the Isles of Scilly and one has to consider from where this person originated. The Roman cases may be explained by the incoming Roman army but, as yet, this has not been proved.

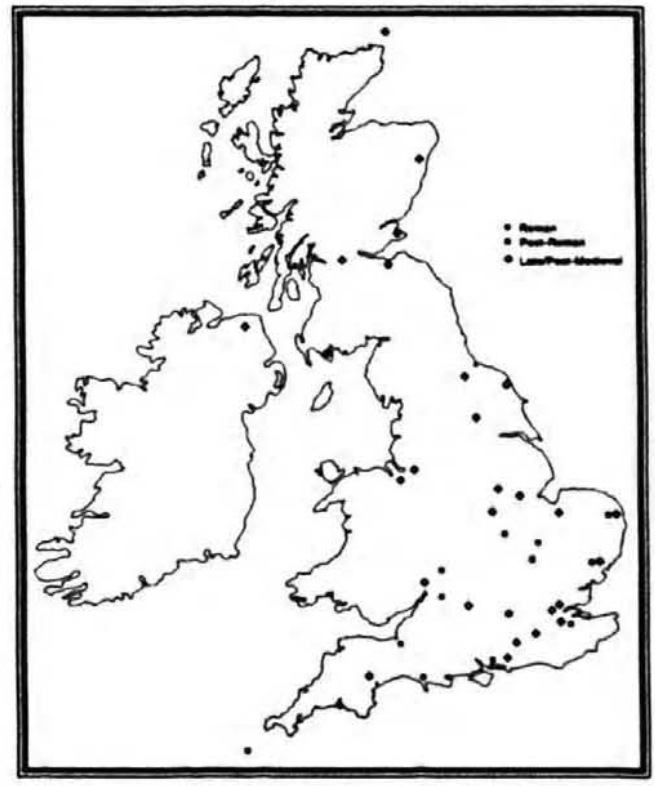

Fig. 8.5. Distribution of leprosy from the Roman to late/post-medieval period. *(Y. Beadnell)*

Fig. 8.6. Distribution of tuberculosis from the Roman to the late/post-medieval period; numbers refer to number of sites if more than one. *(Y. Beadnell)*

Figure 8.6 illustrates the evidence for tuberculosis in Britain. This seems to mirror the leprosy data that, although higher in frequency, the earliest cases are Roman and are located mainly in the south of England. Tuberculosis continues as a health problem into the early-medieval and later periods, located in the south and east of England, again reflecting the population density needed for this infection to flourish. However, the frequencies do not appear to match what we might expect for late- and post-medieval Britain when population densities were very high (as seen in most European countries at that time – Roberts and Buikstra, in press). We suggest that there may be a problem with diagnostic techniques. Most workers diagnose the condition on the basis of Pott's disease in the spine (as discussed in Chapter 3), and this will be a very small percentage of those affected by tuberculosis, as Wood *et al.* (1992) have stated, many people could have had the disease but their skeletons were not affected when they died.

Finally, Figure 8.7 reflects the evidence for treponemal disease, or more specifically venereal syphilis. All cases are late- or post-medieval in date and the late-medieval cases have been radiocarbon and/or archaeologically dated to the pre-Columbian period (pre-AD 1492). Particularly striking about the distribution pattern is that all the cases are from archaeological sites on major rivers or at ports. It is suggested that these cases may be the result of individuals coming in from the continent via trade routes, and that their birthplace may be different to where they settled. In fact, recent work on a skeleton from Rivenhall, Essex using oxygen isotope analysis indicated that this woman had probably been brought up in Norway (Paul Budd and Simon Mays, *pers. comm.*). Obviously further work needs to be done to explore the origin of the other individuals,

Fig. 8.7. Distribution of treponemal disease in the late/post-medieval period; numbers refer to number of sites if more than one. *(Y. Beadnell)*

work that is currently being undertaken. If the first people with venereal syphilis in Britain originated elsewhere, then we might be able to explain the lack of evidence of the disease, and indeed pre-Columbian venereal syphilis, in Britain (Roberts, 1994).

The best data for all the periods considered was that for stature and dental disease. These figures can be considered absolute and thus they will be presented in the following tables.

*Table 8.1: Mean stature (cm) from the Mesolithic to the post-medieval period in Britain*

| Stature | Male (cm) | No. | Female (cm) | No. |
|---|---|---|---|---|
| Mesolithic | 165 | 3 | 157 | 2 |
| Neolithic | 165 ↓ | 71 | 157 – | 36 |
| Bronze Age | 172 ↑ | 61 | 161 ↑ | 20 |
| Iron Age | 168 ↓ | 113 | 162 ↑ | 72 |
| Roman | 169 ↑ | 1296 | 159 ↓ | 1042 |
| Early medieval | 172 ↑ | 996 | 161 ↑ | 751 |
| Late medieval | 171 ↓ | 8494 | 159 ↓ | 7929 |
| Post-medieval | 171 – | 558 | 160 ↑ | 540 |

NB: No. = number of individuals considered; ↑ and ↓ indicate whether stature is increasing or decreasing.

In the Bronze Age we see the first increase in stature in both sexes from the Neolithic period. This continues for females in the Iron Age but the males see a decline. In the Roman period males regain some of their mean height but female stature declines. In the early-medieval period both sexes see a rise in stature and then both decline in the later medieval era. Perhaps the Bronze Age, when agriculture was intensifying and there was more food, allowed better growth, and in the early-medieval period a more rurally based society was benefiting from not living in an urban environment and all that goes with it. In the post-medieval period we see little change from the previous period.

*Table 8.2: Dental caries, abscess and ante-mortem tooth loss (percentage of total teeth/tooth positions) from the Neolithic to the post-medieval period in Britain (absolute prevalence rates)*

| Period | Caries | No. | Dental abscess | No. | Antemortem tooth loss | No. |
|---|---|---|---|---|---|---|
| Neolithic | 3.3 | 2208 | 3.8 | 2158 | 6.1 | 1428 |
| Bronze Age | 4.8 ↑ | 730 | 1.0 ↓ | 1695 | 13.2 ↑ | 2808 |
| Iron Age | 2.9 ↓ | 8232 | 1.1 ↓ | 9578 | 3.1 ↓ | 8965 |
| Roman | 7.5 ↑ | 29247 | 3.9 ↑ | 24995 | 14.1 ↑ | 35762 |
| Early medieval | 4.2 ↓ | 38911 | 2.8 ↓ | 41705 | 8.0 ↓ | 41400 |
| Late medieval | 5.6 ↑ | 35665 | 3.1 ↑ | 13921 | 19.4 ↑ | 22720 |
| Post-medieval | 11.2 ↑ | 12993 | 2.2 ↓ | 18167 | 23.4 ↑ | 13991 |

NB: No. = number of teeth and/or tooth sockets observed; ↑ and ↓ indicate whether the dental diseases are increasing or decreasing.

It appears that the Roman period saw increases in dental disease after a more or less steady decline from the Neolithic period, but rates decline again into the early-medieval era. For the late and post-medieval periods we see increases again with the availability of increased amounts of refined flour and sugar. It is interesting to note that the three dental diseases all appear to rise and fall together through the periods and this may reflect the link between them (with the exception of dental abscesses in the post-medieval period). Clearly, these types of data are much more informative to us than disease frequencies presented according to the number of individuals affected. For

archaeologically derived skeletal remains, we cannot know how much of the skeleton and dentition survived to be examined if data is presented in this way (unless authors provide that information).

**Today** we see many more diseases associated with old age (heart and neoplastic disease, osteoporosis and osteoarthritis) because our life expectancy has lengthened, infant mortality has dramatically fallen and we have better medical care. However, there are disparities in access to (and quality of) health care between different groups such as the poor and ethnic minorities. Our diet (more saturated fats and sugars, and too little fibre) and a decrease in the amount of exercise taken have led to increased rates of heart disease and cancer. We travel more and thereby expose ourselves, and those who come into contact with us abroad and when we return home, to new infections. Our atmosphere appears more polluted, we are suffering more allergies and we are seeing higher rates of respiratory diseases, including asthma. With our developing world we experience more drugs, alcohol and tobacco abuse, and some infections are on the rise because of another form of 'drug abuse' – resulting from antibiotic resistance. Tuberculosis, HIV and food poisoning are all communicable diseases that are on the rise. In some respects we are much better off in terms of health but in others, because of our 'behaviour', we are less well off than our ancestors.

We have a lot of data about the health of our ancestors from the late Upper Palaeolithic to the post-medieval period, data that usefully illustrates to us the type of living conditions (in their broadest sense) that our ancestors encountered during their lives. At times we see a good correlation between cultural context and skeletal data for disease occurrence and frequency, and at others we see a conflict in the results. However, because of the way the data is presented, we cannot, for many diseases, state exactly how frequencies varied through the periods. This is for the future! Brothwell in his 1961a paper stated that 'A palaeopathological survey of early British man must for the moment be regarded as a very incomplete story' and 'more precise and extensive analyses of the common oral and arthritic disorders would be a valuable contribution to the study of disease in earlier British populations' (p. 341).

We would reiterate that for the most part this is still very true, but in our lifetimes we would hope that there will be an improvement in the data recorded, analysed, interpreted and presented for future generations of people to have a more complete picture of the health of the British. It is rather sad that we have not progressed as much as Brothwell had hoped. Furthermore, Howe (1997:78) says: 'The amount of reliable material relating to disease in Britain up to and including Norman times is lamentably small, and when information is available, it lacks detail.' We would say that the data is plentiful but we still lack a lot of detail to take it beyond saying that a particular condition is present.

## RECOMMENDATIONS

We have considered a lot of data for this book: a total of 34,797 skeletons from 311 sites representing samples from a period of over twelve thousand years of British history. The data was generated by many authors (including ourselves) and the reports utilised were dated from 1926 to 2001. Inevitably we have not included all sites from all periods but within the scope of the project this was not possible. However, we do think that we have included all the major sites for each period where data proved useful. For the prehistoric period we did not consider only sites with more than 50 skeletons (as for later periods) because the funerary sites for this period do not generally contain such numbers. Even for the Roman period some sites were below the 50

threshold because the numbers for the Roman sites overall were not large. One therefore has to remember that for the prehistoric period the data on the 1,845 individuals is pooled from 108 sites.

Deciphering what some of the data was telling us was not always easy and much was rejected because it was ambiguous. Unfortunately we are in a situation where some skeletal material has been reburied without adequate recording, something that our colleagues in North America were keen not to see happen here, for obvious reasons. Some skeletal material has not been reported on at all before reburial and, as mentioned above, we are very concerned about the possibility that more of our skeletal material may be reburied before being reported on to an adequate standard. There will be many comments about the quality of the data presented in this book and no doubt disputes about diagnoses. However, we used the data to the best of our critical ability, which brings us to some recommendations for the future study of palaeopathology.

It is important to stress at this point that we have a wonderful collection of skeletal material in the British Isles. It is internationally important and still retains much potential for future analysis. We must emphasise that it remains the primary evidence for disease and when integrated with other forms of evidence provides an insightful and fascinating view on health and disease through time. We should also point out that so much still needs to be, and can be, done. However, we (and others) must not disregard the macroscopic evidence for disease in favour of newer methods of analysis such as biomolecular studies of disease. Looking at ancient DNA and other biomolecules in order to diagnose disease has been a tremendous advance, but we would predict that archaeology in Britain will never, certainly not in our lifetimes, be in a position to fund the biomolecular analysis of all skeletons from all sites to diagnose disease. At present it is not even possible to routinely radiograph every skeleton! Despite such advances in technology (all of which have inherent limitations), the vast majority of data on palaeopathology will continue to be recorded macroscopically. Neither type of analysis is foolproof and both have their advantages and limitations. We therefore suggest that the most important developments to strive for are as follows:

- to develop a standardised method of recording, probably based on Buikstra and Ubelaker (1994) as an absolute minimum, but with a concentration on issues specific to Britain;
- to develop a centralised database of all skeletal collections with key data that will be useful for researchers both nationally and internationally;
- to work together, and with others, to consider research agendas (regionally, nationally and internationally) that could be usefully answered with the skeletal material and data we have, and to consider where our knowledge gaps are (spatial, temporal, contextual, minority groups). Mays (1991a, 1994) and Mays and Anderson (1996) have already started to do this, and the 'History of Health in Europe' project, based in the United States, is encouraging cross-country collaboration;
- to work with European partners, and those from further afield, in order to be able to undertake comparative palaeopathological and anthropological work.

Key to undertaking meaningful work in palaeopathology is ensuring that all people record the data in the same way, and provide basic data that can be usefully compared and contrasted. The development of standards for recording is probably a recommendation that most people working in 'specialist' areas of archaeology would advocate. If we do not have them for the analysis of skeletal assemblages then it is our view that there is absolutely no point in pursuing the history of disease using skeletal data. Of course, the production of skeletal reports has many constraints,

which compromise quality (and sometimes quantity). We considered reports that were unpublished, reports that were published as summaries (with archive data curated where it was originally recorded), and reports that were published more fully. Many people were very generous and allowed us to use unpublished data. However, there was not a single report on the 324 sites we considered (including ones prepared by us) that provided all the information we needed for this book. In addition, there were large parts of the British Isles where there was no data on skeletal remains because the soil pH is such that bone does not survive well, or at all; Wales and Scotland are two cases in point, although in Scotland during parts of the prehistoric period bodies were protected from the soil acidity in stone-lined burial cists. Additionally, excavation intensity is not so high here because of the rural-based nature of these two countries. Furthermore, cremated burials were not considered and for some periods cremation was the primary method of body disposal.

We encountered ambiguous phrasing, and terminology that was, to the expert and non-expert alike, confusing and unintelligible. We read outrageous interpretations, some of which made nice stories but we must not take the interpretation beyond what the data can reasonably support. We considered the use of age at death data and decided it was too problematic to use in association with the palaeopathological data. Many reports were written before most of the currently advocated methods of adult ageing were developed and indeed even they are notoriously unreliable for the over-30s (Cox, 2000). Many authors did not provide references to the methods they used for all aspects of the analysis, but some gave very detailed information. For some reports stature data provided a mean for males and females but no range, and some did not provide the number of individuals on which the stature data was determined. There were considerable differences of opinion as to where specific health problems should be considered in the various reports. For example, should spondylolysis be in the trauma or congenital sections, and should sacralisation be in the congenital section or the discussion about non-metric traits? There was also a tendency to concentrate extensive descriptions and interpretation on the more dramatic conditions to the detriment of those that afflict the majority and impact severely on quality of life, such as dental and joint disease.

Of all the pathological conditions, the dental disease data provided the most useful information. Most authors presented data for absolute frequencies of dental caries, abscesses and ante-mortem tooth loss, compared with number of teeth and tooth sockets (positions) observed. In this area there was also generally more comparative analysis with other sites considered, probably because the data were presented in a standard format. However, even this area of study has zones of neglect. Few gave real frequencies for calculus on teeth observed or enamel defects, and virtually nobody reported age of defect formation (although we accept there are problems with the methodology). Periodontal disease remains inadequately described by most and few understand what the data actually means. Particular problem areas in the different categories of disease focused on joint disease. For example, apart from the considerable confusion over terminology and definitions for joint disease, we often asked ourselves whether 'osteoarthritis' really meant the changes described by Rogers and Waldron (1995), or whether the person was referring to osteophytes (or bone formation around and/or on the joint). There was also confusion with the number of individuals affected by joint disease in samples. Unless a catalogue of individuals was available it was often unclear how many of the total recorded with osteoarthritis were also included in the sections on spinal and extra-spinal joint disease. Furthermore, few authors gave absolute frequencies of osteoarthritis according to numbers of

joints observed. However, some authors gave numbers of vertebrae affected by osteophytes, osteoarthritis and Schmorl's nodes. Few cases of ankylosing spondylitis, Reiter's syndrome, rheumatoid arthritis or gout were recorded for all the periods. Does this reflect problems of diagnosis or that these conditions really were not common until recently? The metabolic disease section tended, for most, to consider the changes of anaemia (cribra orbitalia), with scurvy, rickets, osteomalacia, osteoporosis and Harris lines being neglected. For example, Harris lines of arrested growth were examined in only four of sixty-nine early-medieval sites. Perhaps the lack of data for these conditions reflects the problems of diagnosis, but more likely it reflects a lack of funding for radiography (data on Paget's disease, osteoporosis, etc. suffer similarly). Only recently have clear diagnostic criteria been published for rickets and scurvy (Ortner and Ericksen, 1997; Ortner and Mays, 1998), and for osteoporosis we have the added problem of post-mortem loss of bone sometimes complicating diagnosis. An added problem for scurvy diagnosis is that there may be some confusion with cribra orbitalia and the bone formation seen in the orbits. Circulatory disease recording tends to concentrate on the evidence for osteochondritis dissecans (OD) but we feel that there is some diagnostic problem with differentiating between real OD and a developmental defect or pit in the joint surface. Care must be taken not to diagnose what is not there. Other circulatory problems such as Osgood Schlatter's, Perthes' and Scheuermann's diseases are so infrequently reported that we wonder whether they are being recognised.

Infectious disease is recorded by most authors and most is of the periostitis type of non-specific infection. However, care must be taken with recording new bone formation on very young individuals' bones because the normal growth process could cause these changes. There is a singular lack of evidence for maxillary sinusitis, although if complete and intact sinuses are present then there is little chance to diagnose this condition, unless an endoscope is used. In addition, new bone formation on ribs is rarely recorded. We suggest that this may be because ribs are often fragmented and there may not be the will or the time to record every fragment. There is also a lack of data on ear infection when one might expect to see it in the past, considering its frequency today in children. If ear bones are not considered then the potential data may not be recorded, but observation of the mastoid processes for evidence of mastoiditis (a complication of middle ear infection) would be useful. New bone formation on the inside of the skull is also very rarely reported but, without an endoscope, intact skulls cannot be examined.

Septic arthritis is also rarely recorded. Trauma is usually recorded but, like joint disease, suffers from no absolute frequencies, i.e. bones affected as a percentage of the total observed. One condition, spondylolysis, sometimes benefited from real frequency data, i.e. percentage affected of the number of fifth lumbar vertebrae observed, but this was very rare. Few dislocations were reported at all but perhaps most dislocations 'reduced themselves' (or were treated) and therefore the new joint surface needed for diagnosis never developed, and few clay shoveller's fractures were reported. Very few unhealed fractures were noted; perhaps this may be because they were considered to be post-mortem breaks rather than unhealed fractures or perhaps treatment was such that they successfully healed. Unfortunately, as for joint disease, it was difficult to determine from some skeletal reports (without a full catalogue) whether cases cited as the total number of individuals with fractures were then considered again under different sections considering specific aspects of the data. Finally, the evidence for treatment was negligible, despite the abundance of documentary data for the later periods. However, trepanations and amputations were noted. Again, with respect to these two surgical procedures, there may be confusion in differentiating between a trepanation and a head injury (there may also be both on any one skull), although there shouldn't be as the latter may also

have associated radiating fractures. There may also be problems in determining whether the cut end of a bone is indeed an unhealed amputation, perimortem fracture, or a post-mortem break.

Of course, diagnosis of many palaeopathological conditions has its problems, particularly where peri-mortem trauma is involved, and some people working on skeletal remains have more expertise and experience than others. For many reports the data appeared convincing and it was taken at face value, but for others it was too ambiguous to consider or just not presented in a useable form. If there was one major fault with the majority of reports (apart from the lack of locational and contextual data), then it would be the lack of basic data, i.e. the numbers of individual skeletal elements and teeth available to study, to determine absolute prevalence rates of disease. Archaeologically derived skeletal material is only rarely complete and undamaged and therefore *all* bones and teeth are never available for analysis. Reporting frequencies of disease on the basis of the numbers of individuals affected, as we have had to do for this book, assumes that all bones and teeth were preserved for all skeletons (they are not). The frequencies, therefore, are a gross under-estimate of the real prevalence of disease for past British populations. Finally, there is an almost overwhelming lack of integration of health data in reports with other archaeological data to explain and explore it all, and most published reports remain as part of the appendix in the main archaeological report.

## A DATABASE

One of the main problems in collecting data for this book was knowledge of, and access to, the vast body of information that exists. Many reports considered were not published (77 of 232 for prehistoric, Roman and early-medieval and 42 of 78 late and post-medieval sites) and we relied on their authors providing access to their data. When will all this extant data be published and made accessible to all? Many people working in biological anthropology will already know that there is no consistent publication format, nor are there journals or other publications that publish detailed osteological data. Reports on skeletons may appear in nationally or internationally regarded journals but can equally be found in local archaeological and historical journals, some of which may be inappropriately refereed or not refereed at all. They may appear as monographs or research reports, or the data may be formulated into a scientific paper. However, germane to many reports is the lack of integration of the data with archaeological contextual data, and the skeletal report, together with other 'specialist' reports, is usually relegated to an appendix. We reiterate that people are central to any site because without them the site would not exist so surely they should be considered as an integral part of the site and data set, as central to our understanding as the material culture and other aspects of environmental evidence.

To start to remedy this unsatisfactory state of affairs, we propose that a national but centralised database be constructed which contains pertinent and relevant information, is updated regularly, and is accessible to all at no cost. Data to be included:

- Site name and location with Ordnance Survey grid reference
- Year(s) excavated
- Period (general and specific, e.g. Roman, fourth century AD)
- Site type (e.g. monastic, lay, urban, etc.)
- Funerary context (e.g. cemetery, long barrow, cist)
- Number of skeletons (inhumed and/or cremated)

- Number of skeletons per phase
- Number of males, females, unsexed adults and juveniles
- Preservation details
- Is the archaeology of the site published?
- Relevant information on soil pH, hydrology, depth of burials, topographical context (e.g. coastal, island, inland, highland, lowland, etc.)
- Is the skeletal data recorded, and is it published (including date and ISBN/ISSN)?
- If the report is unpublished, is it accessible and where?
- If it is recorded and/or published, where is the basic data kept?
- A suggestion would be to allow access electronically to unpublished reports and the original archive of hard data (including a skeleton-by-skeleton inventory that includes sex, age, 'race', skeletal and dental data, including preservation details, pathology and trauma, and methods used for recording), including suggestions for further work such as biomolecular applications, radiography, etc.
- Is the skeletal material curated somewhere or is it reburied?
- Details on how to access the archive and skeletons (address, contact details, etc.)
- Restrictions on accessing the archive or the skeletons.
- Bibliography of publications relating to the archaeology and the skeletons from the site

Such a database would be incredibly useful for all people who wish to access information for specific research projects, including undergraduate and postgraduate dissertations, and major grant-seeking projects. It would also be helpful for our international colleagues trying to find information about where skeletal collections are curated (and of what quality, in their broadest sense). It would save unnecessary handling of material and ensure that it survives in a better state for longer. Currently we are in a position whereby students and established staff begin a project and have to start by trying to identify where the relevant skeletal collections are (or whether they are still above the ground); this is a very time-consuming process. If we could eliminate the need to do this every time a new research project is started, then research grants could be more effectively utilised and we would be seen to be conducting our work much more professionally than we are at present.

## STANDARDISATION OF RECORDING

A database is a start, but the data we record for each individual skeleton for each site must have some standardisation and a logical format. Of course some people prioritise what they record and place emphasis on certain aspects of their work because they are particularly interested in it or are conducting research on the area. However, it should not be a problem for everyone to record a basic set of data which would then allow others to record in more detail what they are particularly interested in. We are not recommending how to record data because this is an area that is being discussed within our community now (October 2002), but we would emphasise that we need standards. With the developments in possible reburial of some of our skeletal remains (May 2001), and the initiation of the 'History of Health in Europe' project (June 2001), we do need to generate some recommendations for recording that everybody in the British Isles is comfortable in using (if only for these reasons). Some of the standards we use could be derived from Buikstra and Ubelaker (1994), and developed with Britain in mind. Important too is the

need to provide a basic catalogue of individuals from the site giving data on 'race', age, sex, preservation, stature, non-metric traits and pathological lesions, plus a detailed table of the bones and teeth present and absent. This will enable either the author or subsequent readers to determine true prevalence rates of disease that will allow us to really look at data frequencies (and make comparisons with data outside the British Isles). All methods of analysis used should be cited, and definitions of disease and the diagnostic criteria used given using appropriate photographic and radiographic aids. We are all very much aware of the problems of diagnosis of disease, as highlighted by Miller *et al.* (1996), Ortner (1991) and Wood *et al.* (1992), and differential diagnoses should always be considered. Descriptions of pathological conditions are key to any work in palaeopathology, whether they exist in the body of the report itself, in an appendix, in microfiche form or in a site archive. The actual content of the report is often very much dictated by the mode of publication but there could also be some recommendations and guidance established with this in mind (perhaps a development from Roberts, 1996). We have a good future ahead of us in Britain in the documentation, analysis and interpretation of the health of our ancestors but we need to work on improving what we have been doing for so many years.

## A FINAL WORD

We have endeavoured to produce an overview of health and disease in Britain from prehistory to the present. This is the first time that such a feat has been attempted and we have, at times, found the task daunting and demoralising. Our work has highlighted the deficiencies in the study of human remains over the last century but it has, nevertheless, produced an assessment of the trends suggested by our datasets within the broader biocultural context of the last twelve thousand years. Our fervent hope is that our work will be useful in its immediate intent, but even more so that it will serve to trigger a radical improvement in the science and the area of intellectual enquiry to which we have committed a significant amount of our respective careers. We very much look forward to reading (no doubt in our dotage) the endeavours of those who will have the good fortune to work with the compatible and meaningful data that future research will generate. Please don't disappoint us!

The study of health and disease in Britain has a great future and Britain has many trained and competent people working in this field to take the subject forward. However, our future could be blighted if we do not attend to the problems we have encountered in our experience of writing this book. We hope to see an improvement in future years in the recording, analysis, integration, interpretation and publication of data, an improvement that should not be difficult to achieve considering the baseline from which we are working. Perhaps then the study of human skeletal remains in Britain will not, as Mays (1998a:195) suggests, 'remain marginalised in British archaeology', and hopefully the integration of skeletal and cultural contextual data will start to seriously tackle archaeological questions in Britain.